Cylinder heads and valves

Cylinder heads – To remove (see fig. E8-1)
The operations listed form the basic procedure to be followed. In service, minor variations to this procedure will be encountered due to the specification of the vehicle.

1. Carry out the usual workshop safety precautions.
2. Drain the cooling system (see Chapter L).
3. Depressurize the hydraulic systems (see Chapter G).
4. Slacken the drive belts at the front of the engine.
5. Remove either the fuel injection system equipment or turbocharging equipment as described in the Engine Management Systems Manual – TSD 4737.

Induction manifold

6. Detach the refrigeration compressor from its mountings and move it from the vicinity of 'B' bank cylinder head.
7. Remove the alternator (see Electrical Manuals – TSD 4701 or TSD 4848).
8. Disconnect the throttle linkage at the ball joint located at the top of the long control rod. Then, detach the linkage trapeze mounting bracket from the body longeron.
9. Disconnect the coolant hose from the thermostat housing outlet connection.
10. Disconnect the heater feed pipe at the rear of 'B' bank cylinder head.
11. Detach all electrical connections from the thermostat housing switches. Label each one to facilitate assembly.
12. Remove the setscrews securing the thermostat by-pass pipe to the coolant pump.
13. Unscrew the transmission modulator pipe from the union situated at the rear of the induction manifold.
14. Disconnect the pipes from the hydraulic brake pumps.
15. Remove the induction manifold setscrews and collect the washers.
16. Carefully withdraw the induction manifold. Discard the gaskets.

Rocker covers

17. Remove the speed control actuator assembly from the rear of 'A' bank cylinder head (if not removed previously).
18. Unscrew both the cap and reach nuts from the rocker covers.
19. Disconnect the leads from the sparking plugs.
20. Remove the nut and bolt securing the engine dipstick tube to the harness shaft ('B' bank).
21. Withdraw the ignition harness from the mounting studs on the rocker covers.
22. Carefully free the seal and withdraw the rocker cover.
23. Repeat Operations 18 to 22 inclusive to the other rocker cover.
24. Remove the steering pump (see Chapter N).

Cylinder head

25. Unscrew the rocker shaft retaining setscrews but **ensure that they remain through the shaft.**
26. Withdraw the rocker shaft assembly.
27. Repeat Operations 25 and 26 on the other rocker shaft.
28. Withdraw the push rods.
29. Remove the exhaust manifolds (see Chapter Q).
30. Using box spanner RH 7126, unscrew the cylinder head nuts. Commence by unscrewing the nuts at each end of the assemblies and progressively work inwards.
31. Carefully free the cylinder head(s) and withdraw it from the engine. Take care to ensure that the studs do not damage the face of the cylinder head(s), or that the threads of the studs are not damaged as the cylinder head(s) is withdrawn.
32. Withdraw and discard the cylinder head gasket(s).

Cylinder head – To fit (see fig. E8-1)
Fit the cylinder head(s) by reversing the procedure given for removal, noting the following.

1. Always ensure that the cylinder head gasket(s) is fitted correctly. The word TOP is marked on one side.
2. Cylinder head gaskets should be fitted dry. **No jointing compound is necessary.**
3. If any core plugs are to be fitted, ensure that a new sealing washer is used and the thread of the plug is coated with Loctite Superfast 572. The core plug should then be torque tightened to the figures given in Section E15.
4. Before fitting the cylinder head nuts, ensure that the stud threads are clean and lubricated with clean engine oil. Screw the nuts onto the threads 'finger tight' and then torque tighten them in the correct sequence (refer to Section E15).

Valves – To remove (see fig. E8-1)
Label the parts as they are removed. This will ensure that they can be reassembled into their original position.

To remove the valves, special tool RH 7094 is required (see inset B).

1. Remove the cylinder heads.
2. Fit a valve tool pedestal at each end of the cylinder head. The pedestals locate in the recesses used for the rocker pedestals and are secured by nuts and bolts.
3. Place the cylinder head on a suitable base. Ensure that four wooden blocks fit into the combustion chambers. The blocks support the valves whilst the springs are compressed.
4. Insert the fulcrum bar through the holes in the pedestals.
5. Fit the valve spring compressing tool under the fulcrum bar and fit the stirrup over the valve top washer.
6. Compress the valve spring and remove the two collets.

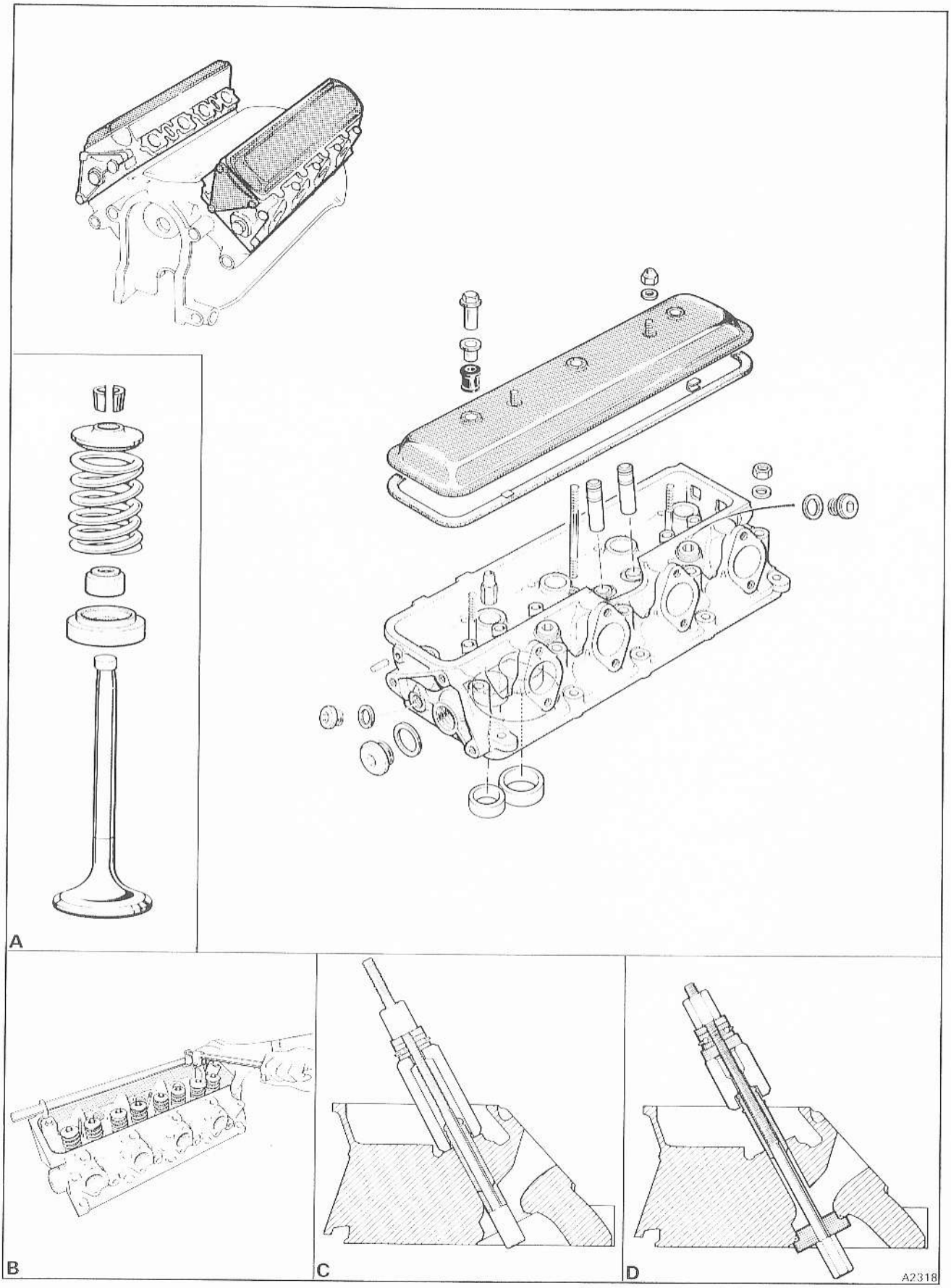


Fig. E8-1 Cylinder head assembly

7. Gradually release the pressure from the spring compressing tool.
8. Move the stirrup from the valve top washer.
9. Dismantle the assembly (see inset A) as follows.
Withdraw the top washer, valve spring, valve stem seal, and bottom washer.
10. Repeat Operations 5 to 9 inclusive to the remaining valves in the cylinder head.
11. Turn the cylinder head over and withdraw the valves.

Valves and valve seat inserts – To inspect and reface
1. Remove the valves from the engine. Note that each valve has its cylinder number etched onto the side of the tip.
2. Visually check that each valve head and seating area is serviceable. If a valve appears to be burnt away or cracked in the seating area, fit a new valve.
3. Clean all carbon from each valve head and cylinder head combustion area, using a wire brush.
4. Wash the valves and cylinder head in clean paraffin. Then, dry with compressed air.
5. Check that each valve seating area in the cylinder head (valve insert) is serviceable. Fit a new valve insert if any are badly worn, burnt, or cracked.
6. Ensure that the stem and head of each valve is not bent.
7. Reface the seating area on each valve and valve seat insert using the appropriate reconditioning equipment. The seat angle should be 45°.
When refacing the valve seats, remove the minimum amount of material possible to give a 'clean' seating.
Note If new valve guides have been fitted, they should be reamed before the valve seat inserts are faced.
8. If necessary, the exhaust valve seat inserts may be crowned with a 30° cutter to prevent pocketing.
9. Using a fine, good quality lapping paste, lightly lap each valve to its seat. Check the seating using Prussian blue.
10. Thoroughly wash the cylinder head(s) and valves in paraffin to remove all grinding dust and lapping paste. Dry using compressed air.

Valves – To fit (see fig. E8-1)
To fit the valves reverse the procedure given for removal, noting the following.
1. If any parts are serviceable, always ensure that they are fitted in their original positions.
2. Check that the valves operate smoothly in their respective guides and that they are seating correctly.
3. New valves are specially treated on the stems to aid running-in. The black appearance will wear off in service. However, this will not affect the surface hardness.
Under no circumstances must this coating be removed. However, if the coating has worn off or if new rubber valve stem seals are fitted, the valve stems and guides should be lubricated.
4. When lubrication of the valves is required, the valve stems should be lubricated with an assembly lubricant such as either Molykote G Rapid or Rocol MTS 1000. In addition, the valve guides should be lubricated with clean engine oil.

Valve guides – To inspect
The valve guides should be inspected whilst they are still fitted in the cylinder head.
1. Obtain a new valve guide. Examine the existing valve guides for wear, comparing them with the new guide.
2. The maximum permissable wear on the valve guides is given in Section E4, Dimensional data. If the wear tolerance is exceeded, the valve guides should be removed from the cylinder head and new ones fitted as described in Valve guides – To remove and fit.
3. 'Bellmouthing' at the bottom end of the valve guides is permissable within the tolerances specified in Section E4, Dimensional data.
4. Check the clearance in the bore between each valve stem and its respective guide (refer to Section E4, Dimensional data, for the permissable tolerance).

Valve springs – To inspect and test (see fig. E8-1)
1. Dismantle the valve arrangement, refer to Valves – To remove.
2. Wash the springs in clean paraffin and dry using compressed air.
3. Visually examine the valve springs for defects.
4. Check the poundage of each spring on a valve spring tester. Data for this poundage check can be found in Section E4.

Valve guides – To remove and fit (see fig. E8-1)
1. Remove the cylinder head(s).
2. Dismantle the valve assemblies.
3. Remove the valve guides using special tool RH 7207 (see inset C). Withdraw the guides from the top (rocker side) of the cylinder head.
4. Thoroughly clean the valve guide bores in the cylinder head and accurately measure the bore diameters.
5. Select a new set of oversize guides that will give the correct interference fit when installed in the cylinder head (see Section E4, Dimensional data).
6. Using the special tool RH 7207 (see inset D), draw the valve guides into the cylinder head from the top (rocker side). Ensure that the shoulder of the guide abuts the cylinder head.
7. Using the special reamer RH 7825, or the tungsten carbide tipped version RH 7827, ream both the inlet and exhaust valve guides to the finished size.

Valve seat inserts – To remove (see fig. E8-1)
1. The valve seat inserts should be machined out of the cylinder head, leaving a thin skin of the insert material approximately 0,25 mm (0.010 in) thick remaining in the cylinder head.
2. After machining, carefully remove the insert shell from the bore in the cylinder head.

Valve seat inserts – To fit (see fig. E8-1)
1. Compare the size of the insert bore in the cylinder head with the standard figures given in Section E4, Dimensional data.
2. If the bores do not conform to the size quoted, it will be necessary to machine them to a larger diameter and

to fit oversize seat inserts (refer to the Parts List).
3. Ensure that the correct interference fit is maintained when the inserts are fitted into the cylinder head (see Section E4, Dimensional data).
4. To fit the inserts, place the cylinder head in an oven, or heat evenly to a temperature of 150°C (302°F) for a period of one hour.
5. The cylinder head should be quickly removed from the oven and the insert(s) driven into position using a soft drift.
6. Ensure that the shoulder of each valve guide is in contact with the cylinder head (i.e. that it has not moved during the time that the cylinder head was in the oven or when the valve seat inserts were driven into position).

Note Do not finish machine the valve seats until after the valve guides have been reamed.

If the necessary service facilities are not available, it is recommended that the cylinder heads be returned to Rolls-Royce Motor Cars Limited for this work to be carried out.

Decarbonizing

Carbon deposits form in the combustion chambers and affect the cylinder heads, valves, and piston crowns.

To decarbonize the engine it will be necessary to remove and dismantle the cylinder heads, then proceed as follows.

1. Ensure that the piston is at tdc. Using a blunt tool carefully remove the carbon deposit from the piston crown and the top face of the liner. Do not use a wire brush.
2. Carry out a similar exercise with the blunt tool on the valves. Complete the removal of the carbon deposit using a wire brush.

Take care not to damage the valve seat or to make heavy score marks in the cylinder heads. Heavy score marks will quickly accumulate carbon and seriously impair engine performance.

3. Ensure that as the carbon is removed, it does not enter the coolant passages of the crankcase and cylinder heads.
4. Discard the sparking plugs for new ones.
5. Repeat Operations 1 to 4 inclusive on the remaining combustion chambers and their respective components.
6. Wash the cylinder heads and valves in paraffin and dry with compressed air.
7. Inspect the valve guides.
8. Inspect the valves, the valve seats, and the valve seat inserts.
9. Inspect the valve springs.
10. Assemble the engine by reversing the procedure given for dismantling, noting the following.

a. Use new gaskets and seals.
b. Torque tighten all nuts and setscrews to the figures quoted in either Section E15 or Chapter P.

Crankcase breather system

Crankcase breather housing – To remove and fit
(see fig. E9-1)
All engines
1. Withdraw the starter relay situated either;
   a. Adjacent to the windscreen washer reservoir (Four door cars prior to 1989 model year, and all Corniche/Corniche II/Continental cars) **or**
   b. Between the spring pot support brackets on the

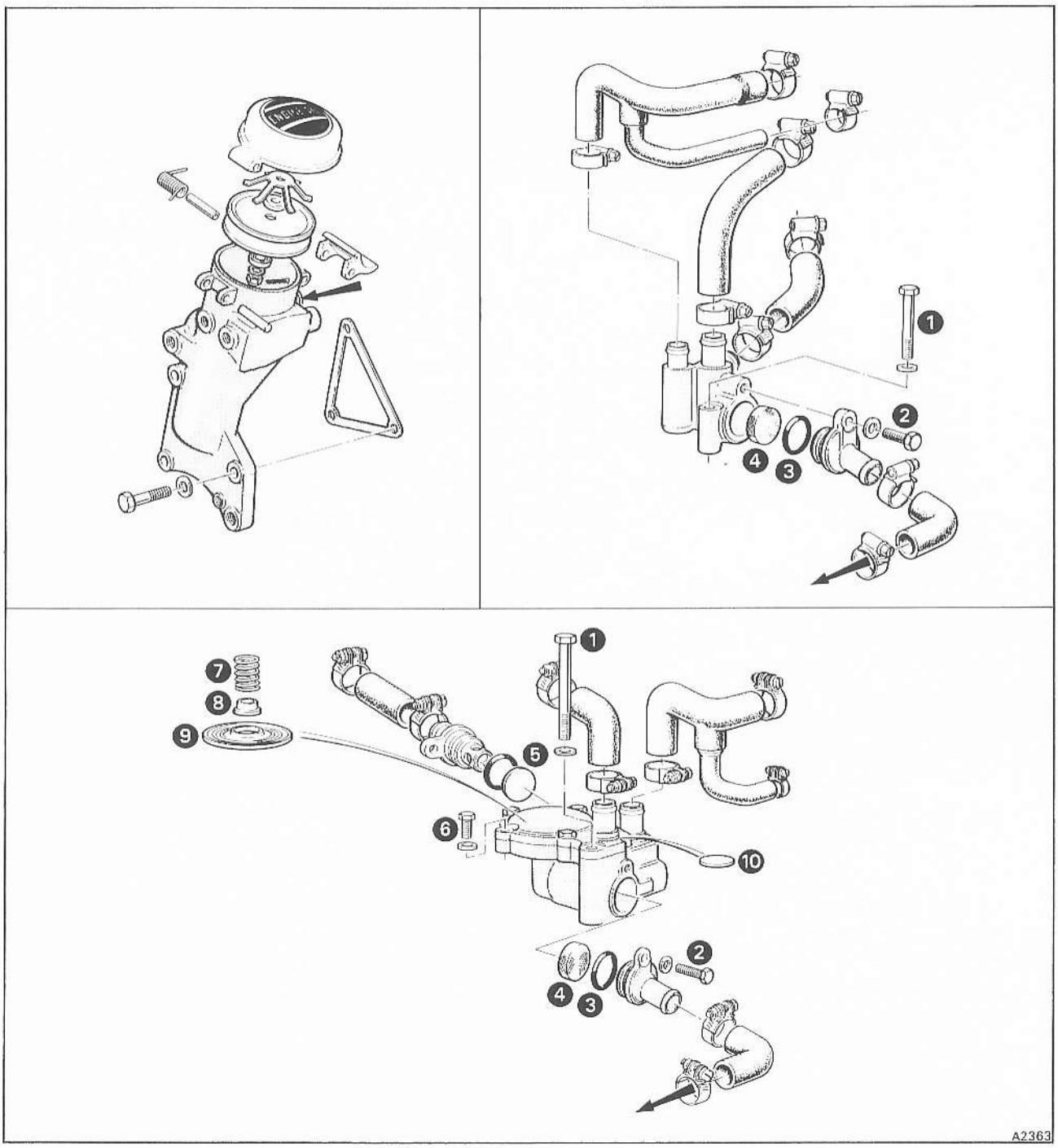


Fig. E9-1 Crankcase breather system

right-hand side of the engine compartment. To gain access to the relay, remove the cover panel (1989 model year – Four door cars).

2. Slacken the worm drive clips on the hoses leading to the breather housing. Label each hose for identification and then free each joint.

3. Remove the setscrews (item 1) securing the breather housing to the engine. Withdraw the assembly.

4. Slacken the worm drive clips securing the hoses to the housing and withdraw the hoses.

5. Remove the setscrew (item 2) retaining the inlet elbow to the housing. Ease the flange from the housing, noting that slight resistance may be encountered due to the rubber sealing ring (item 3) on the locating spigot.

6. Insert a small pointed instrument into the gauze and carefully lever the flame trap (item 4) from the housing.

Turbocharged engines

7. Repeat Operation 5 on the connection to the induction manifold.

8. Collect the metal disc valve (item 5) situated behind the flange.

9. Unscrew and remove the setscrews (item 6) situated around the top of the assembly.

10. Withdraw the top and collect the spring (item 7), guide washer (item 8), and diaphragm (item 9).

11. Collect the metal disc valve (item 10) from the smaller chamber located above the flame trap aperture.

All engines

12. Clean all parts and examine them for serviceability, particularly the rubber sealing ring(s) and diaphragm (if fitted).

If the rubber parts have covered a high mileage and/or show signs of deterioration, they should be renewed.

13. Assemble the breather housing and fit it to the engine by reversing the dismantling procedure.

Engine lubrication system

Oil pump – To remove (see fig. E10-1)
The operations listed form the basic procedure to be followed. However, minor variations may be encountered due to the specification of the engine.

All engines
1. Drive the vehicle onto a ramp and chock the road wheels.
2. Carry out the usual workshop safety precautions.
3. Drain the engine coolant (see Chapter L).
4. Drain the engine oil.
5. Remove the bonnet and radiator grille (see Chapter S).
6. Remove the engine drive belts (see Section E13).
7. Remove the alternator (see Electrical Manuals – TSD 4701 or TSD 4848).
8. Remove the oil cooler pipes (item 1) from the lower front cover.
9. Remove the auxiliary cooling fans (see Electrical Manuals – TSD 4701 or TSD 4848).
10. Remove the refrigeration condenser (see Chapter C), radiator matrix and cowl, viscous coupling, and cooling fan (see Chapter L).

Turbocharged engines
11. Remove the large exhaust downtake pipe between the turbocharger and the flexible bellows. Also, remove the large heatshield which is secured by setscrews to the turbocharger and the lower front cover.
12. Remove the exhaust crossover pipe and heatshield from beneath the sump.
13. Remove the turbocharger oil return pipe to the lower front cover.

All engines
14. Remove the setscrews retaining the refrigeration compressor mounting bracket to the engine (see Chapter C). Move the compressor and mounting bracket from the vicinity of the coolant pump.
15. Remove the air injection pump (if fitted) as described in the Engine Management Systems Manual – TSD 4737.
16. Remove the steering pump (see Chapter N).
17. Disconnect the engine coolant pipes (including the heater return pipe) from the coolant pump.
18. Remove the setscrews securing the thermostat housing to the coolant pump.
19. Remove the setscrews securing the coolant pump to the crankcase. Withdraw the coolant pump.
20. Discard the Neoprene seal which fits between the coolant pump and lower front cover.
21. Remove the setscrews from the centre of the crankshaft pulley/damper. Withdraw the pulley/damper assembly.
22. Remove the nut securing the drive flange to the crankshaft.
23. Using extractor RH 9765, withdraw the drive flange. The flange is dowelled to the crankshaft.
24. Ensure that all weight is removed from the engine front mounting foot. Then, remove the setscrews from the engine mounting situated below the lower front cover.
25. Disconnect the electrical cables from the pressure switch and oil pressure transmitter. Then, remove all the setscrews securing the lower front cover (see inset A).
26. Carefully slide any packing pieces from between the bottom of the lower front cover and the mounting foot. Slightly raise the engine if necessary. Take note of the packing pieces so that they can be returned to their correct positions.
27. Insert a feeler gauge or similar tool between the bottom of the lower cover and the sump gasket. Slowly work the feeler gauge around the joint to 'break' the seal.
28. Withdraw the front cover (the cover is dowelled to the crankcase). Discard the gasket. Remove the oil transfer pipes (item 2) between the front cover and crankcase. Discard the 'O' rings.
29. Remove the oil pipe retaining plug from 'B' bank side of the crankcase.
30. Push the oil pump outlet pipe (item 3) through the crankcase. Then, remove the setscrews securing the pump outlet elbow (item 4). Discard the gasket from the outlet elbow and the 'O' rings from the outlet pipe.
31. Remove the setscrews (item 5) securing the pump to the crankcase. Then, withdraw the pump together with the dowel inserts (item 6).
32. To remove the oil pump driving gear, refer to Section E5, Crankshaft – To dismantle.

Oil pump – To test
The pump must be tested on a rig which has a variable orifice so that the oil delivery pressure from the pump can be restricted. The rig should also be able to drive the pump at a controlled speed and be capable of maintaining a constant temperature of 80°C (176°F) for the duration of the test.

If these facilities are available, the pump should be tested as follows.
1. Drive the pump at 200 rev/min, then adjust the variable orifice until the pump is delivering oil at 1,03 bar (15 lbf/in^2). With the orifice at this setting the oil pump delivery should be at least 4,55 litres/min (1 gal/min).
2. Maintain the orifice at this setting. Then, increase the speed to 1500 rev/min, the pump should deliver no less than 9,0 litres/min (2 gal/min) at 2,89 bar (42 lbf/in^2).
3. The relief valve should blow at approximately 2,89 bar (42 lbf/in^2).

If the performance of the pump does not conform to these figures, proceed as follows.
4. Examine the working faces of the pump cover and if necessary, remove light wear marks by machining.

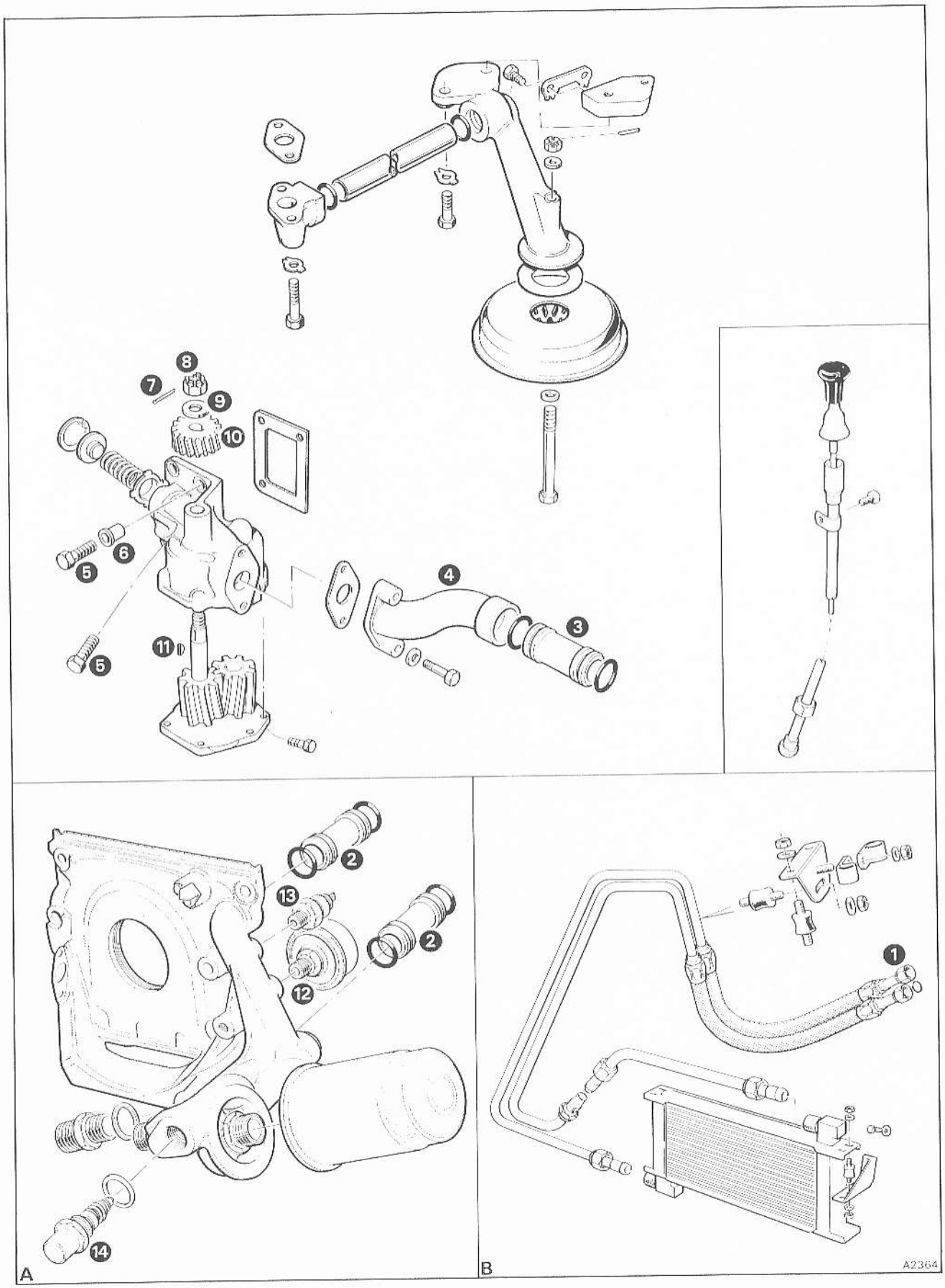


Fig. E10-1 Engine lubrication system components

5. Compare the pump clearance with the figures given in Section E4 – Dimensional data. If necessary renew the pump casing and fit a new matched set of gears.
6. If the condition of the pump is poor, the complete pump should be renewed.

Oil pump – To dismantle (see fig. E10-1)
1. Hold the external driving gear in a suitable fixture, taking care that sufficient protection is provided to ensure that the teeth of the gear are not damaged.
2. Remove the split pin (item 7), nut (item 8), and washer (item 9), securing the driving gear to the driving shaft; carefully withdraw the gear (item 10) using the extractor RH 8141. Remove the Woodruff key (item 11) from the shaft.
3. Unscrew the setscrews, remove the end cover and withdraw the two gears from the casing.

Oil pump – To assemble (see fig. E10-1)
1. Assemble the oil pump by reversing the procedure given for dismantling noting the following.
2. Examine all working parts for wear and inspect the end cover and casing for distortion; renew if necessary. If the end cover is lightly scored the marks may be removed by machining.
3. If the drive gear is serviceable, always ensure that it is fitted into position the same way around as it was removed.
4. Check that the end-float in the gears and the backlash between the pump driving gear and driven gear (internal gears) is correct (see Section E4, Dimensional data).
5. Torque tighten the setscrews, nuts, and bolts to the figures specified in Chapter P.

Oil pump – To fit (see fig. E10-1)
1. Fit the oil pump by reversing the procedure given for removal, noting the following.
2. Always ensure that the oil pump gear is of a different material to the mating gear on the crankshaft. The oil pump gear should be steel and the crankshaft gear bronze.

Under no circumstances should gears of like metals be fitted.

If a new oil pump driven gear is to be fitted, also fit a new oil pump driving gear to the crankshaft.
3. If the drive gear is serviceable, always ensure that it is fitted into position the same way around as it was removed.
4. Ensure that all setscrews, nuts, and bolts are torque tightened to the figures specified in Chapter P.
5. Ensure that the backlash between the driving gear on the crankshaft and the gear on the pump is correct (refer to Section E4, Dimensional data and figure E10-2).
6. When fitting the setscrews securing the pump to the engine, ensure that the dowel inserts are fitted to the holes from which they were removed.
7. Renew the 'O' rings on the oil transfer pipes.
8. Fit new joints to the lower front cover and the oil pump. If the front cover to sump joint is damaged or in poor condition it will be necessary to remove the sump to enable a new joint to be fitted.

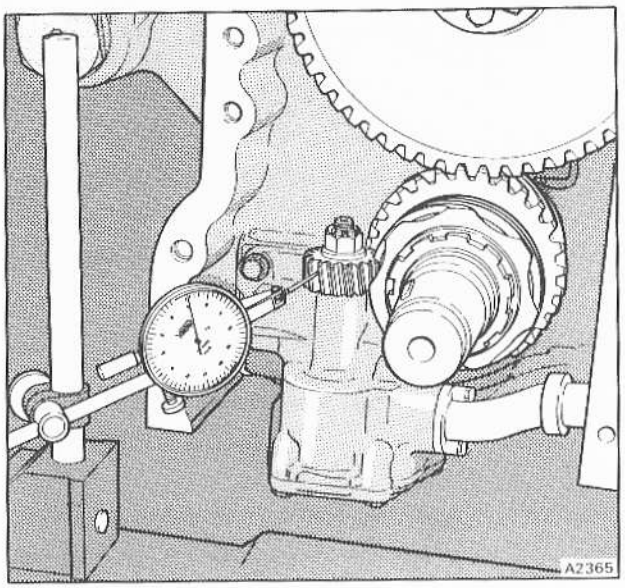


Fig. E10-2 Checking backlash of oil pump gears

9. Set the front engine mounting stop plate gap (refer to Section E12).
10. Fit a new Neoprene seal between the coolant pump casing and the lower front cover; also renew the coolant pump 'O' rings.
11. Examine all coolant hoses for deterioration and replace any that are considered unserviceable.
12. Ensure that the driving belts are fitted and adjusted correctly (refer to Section E13).
13. Fill the engine cooling system with the correct anti-freeze mixture (refer to Chapter L).
14. Fill the engine with an approved oil (refer to Engine oil, Sump – To fill).

Oil filter canister – To renew (see fig. E10-1)
1. Drain the oil from the engine by carrying out Operations 1 to 8 inclusive, under the heading Engine oil, Sump – To drain.
2. Position a suitable container beneath the oil filter.
3. Support the filter and unscrew, using a suitable strap spanner.
4. Discard the complete filter canister assembly.
5. Examine the new canister to ensure that it is a suitable approved replacement and that the rubber sealing ring is positioned correctly.
6. Lightly smear the sealing ring with clean engine oil.
7. Fit the new canister and tighten, using hand pressure.

Oil pressure gauge transmitter and/or pressure switch – To renew (see fig. E10-1)
1. Carry out the usual workshop safety precautions.
2. Disconnect the electrical cable at the Lucar connection on the transmitter (item 12) and/or pressure switch (item 13).
3. Using the appropriate size spanner, unscrew the unit anti-clockwise.
4. Fit the unit in the reverse order, ensuring the threads are coated with Loctite 572 prior to fitting.

Oil thermostat – To renew (see fig. E10-1)
The function of the thermostat (item 14) fitted into the oil filter elbow is to allow oil to flow through the engine oil cooler when it has reached a predetermined temperature.
1. Carry out the usual workshop safety precautions.
2. Unscrew the thermostat from the elbow.
3. Fit the assembly in the reverse order, noting that the sealing washer is in good condition and that the threads are coated with Loctite 572 prior to fitting.

Oil level sender unit – To renew
1. Carry out the usual workshop safety precautions.
2. Drain the engine oil (refer to Sump – To drain).
3. Locate the assembly situated in the side of the sump.
4. Remove the heatshield.
5. Disconnect the electrical connection.
6. Remove the setscrews securing the unit in position and collect the washers.
7. Carefully 'free' the joint and withdraw the sender unit.
8. Fit the assembly in the reverse order, noting that the joint faces must always be clean. Always fit a new gasket coated with Wellseal. Ensure that the word 'Top' stamped on the assembly is towards the top of the engine.
9. Fill the sump with oil (refer to Sump – To fill).

Engine oil

Sump – To drain
1. Position the car on a ramp and carry out the usual workshop safety precautions.
2. Raise the ramp.
3. Position a suitable container beneath the sump drain plug.
4. Clean the drain plug, sealing washer, and a small area of the sump around the drain hole.
5. Unscrew the drain plug, collect the aluminium sealing washer and allow the oil to drain into the container.
6. Examine the condition of the aluminium sealing washer and renew if necessary.
7. Ensure that the plug and washer seating area on the sump is both clean and dry.
8. Fit the sealing washer and plug to the sump and tighten.
9. Fit a new oil filter canister if necessary by carrying out Operations 2 to 7 inclusive, under the heading Oil filter canister – To renew.

Sump – To fill
It is most important that only engine oil of an approved grade and manufacture is used, refer to Chapter D.
1. Raise the bonnet and open the filler cap.
2. Pour 8,4 litres (14.7 Imp pt, 17.7 US pt) of fresh approved oil into the system via the filler, 9,4 litres (16.5 Imp pt, 19.8 US pt) if the filter has been changed.
3. Check the oil level.

Sump – Oil level to check and top-up
The vehicle must be standing on level ground and the engine switched off. It is most important that only engine oil of an approved grade and manufacture is used, refer to Chapter D.
1. If the sump has just been filled with fresh oil or if the engine has been switched off, allow at least four minutes for the oil to drain into the sump.
2. Withdraw the engine oil dipstick and wipe it clean.
3. Insert the dipstick into its position.
4. Withdraw the dipstick and read the oil level.
Maximum and minimum oil level marks are indicated on the dipstick.
5. Top-up the oil level if necessary, by pouring a small quantity of fresh engine oil through the filler.
Do not overfill.
6. After topping-up ensure that the filler cap and bonnet are properly closed.

Important Do not operate the engine if the oil level is below the minimum mark on the dipstick. Failure to observe this precaution could result in serious damage to the engine.

If the filter canister and/or the sump drain plug have been disturbed, check for oil leaks around the two components, immediately after the engine has been started.

Engine oils
Prolonged and repeated contact with mineral oil will result in the removal of natural fats from the skin, leading to dryness, irritation, and dermatitis. In addition, used engine oil contains potentially harmful contaminants which may cause skin cancer. Adequate means of skin protection and washing facilities should be provided.

For full details on engine oil precautions, reference should be made to Chapter A.

Hydraulic pump push rod assemblies

Hydraulic pump push rod assembly – To remove
(see fig. E11-1)

1. Carry out the usual workshop safety precautions.
2. Remove either the fuel injection system equipment or turbocharging equipment as applicable (see Engine Management Systems Manual – TSD 4737).
3. Drain the engine coolant (see Chapter L).
4. Depressurize the hydraulic systems and remove the

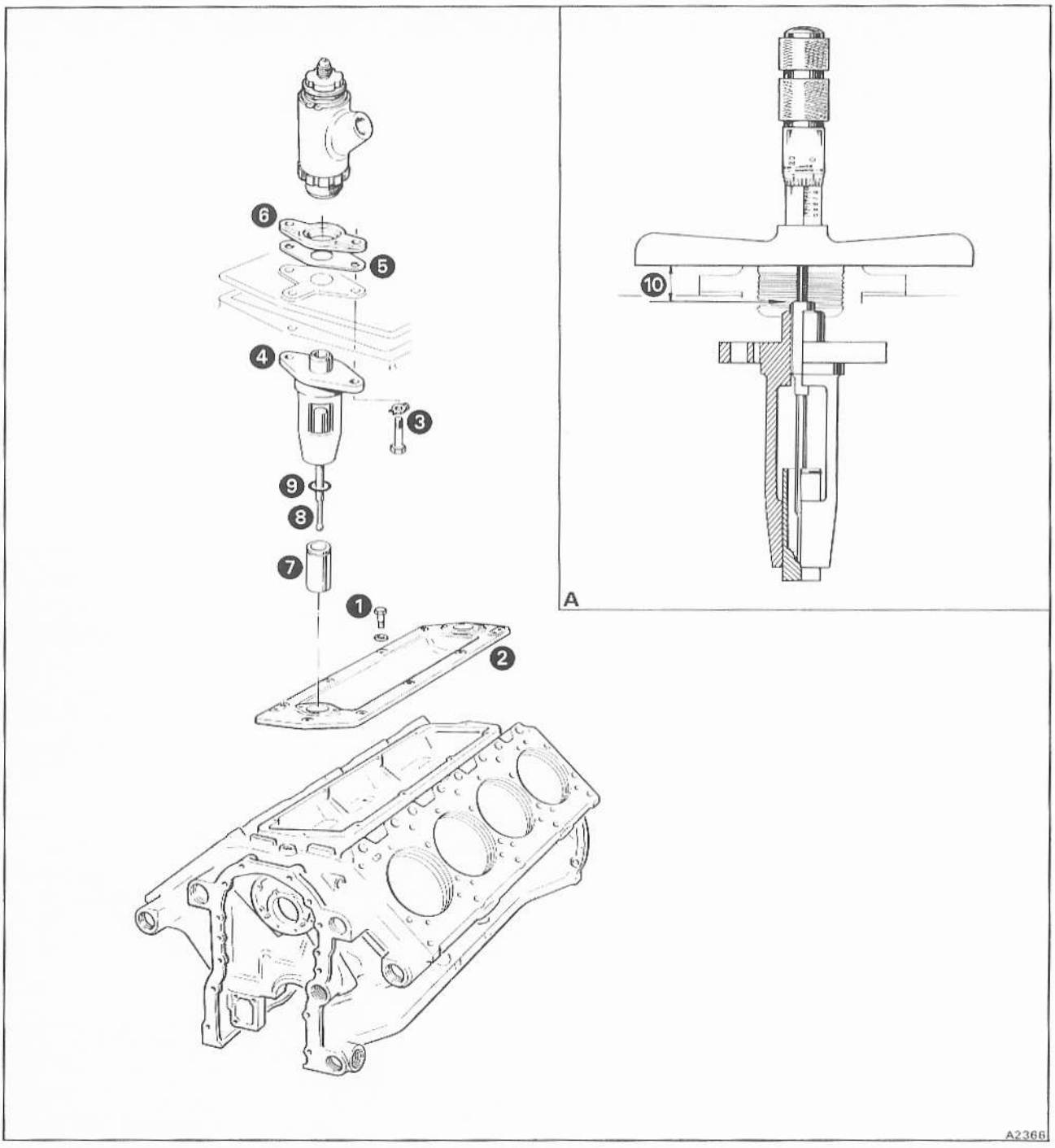


Fig. E11-1 Hydraulic pump push rod assemblies

hydraulic pumps (see Chapter G).
5. Remove the induction manifold.
6. Progressively unscrew the setscrews (item 1) securing the tappet chest cover to the crankcase. **The setscrews must be removed progressively,** otherwise if the brake pump operating cams are at their peak, distortion could occur to the tappet chest cover.
7. Withdraw the tappet chest cover (item 2).
8. From the underside of the tappet chest cover, bend back the tabs of the lock-washers (item 3).
9. Unscrew the setscrews securing the push rod housings (item 4) to the tappet chest cover.
10. Remove the housings. Collect the shims (item 5) if fitted, as the pump mounting flange (item 6) and push rod housing are detached.

Push rod housings – To dismantle and assemble
(see fig. E11-1)
1. Slide the push rod (item 8) through the hole in the push rod housing.
2. Press the cam follower (item 7) into the centre chamber of the housing (see inset A). Lift out the cam follower.
3. Discard the 'O' ring (item 9).
4. Examine the components for wear.
5. Clean the groove in the cam follower and fit a new 'O' ring.
6. Wash all components in clean paraffin.
7. Assemble the components by reversing the dismantling procedure.

Hydraulic pump push rod assembly – To fit
(see fig. E11-1)
1. Ensure that all components are clean, particularly the mating faces of the tappet chest cover and the crankcase.
2. Fit the push rod housing assemblies to the underside of the cover.
3. Fit the pump mounting flange and shim(s) on top of the cover and secure in position with setscrews and lock-washers.
4. To check that the push rods are correctly set, rotate the camshaft until both hydraulic pump eccentrics are at bottom dead centre (bdc).
5. Temporarily fit the tappet cover and progressively tighten the setscrews.
6. Rotate the engine to find the exact bdc position of the hydraulic pump push rod.
7. Using a depth micrometer placed across the pump mounting flange, measure the dimension to the top of the push rod (see item 10). This dimension should be between the figures quoted in Section E4, Dimensional data.
8. If the dimension is incorrect it will be necessary to alter the shims under the pump mounting flange. The shims are available in two sizes, refer to Section E4, Dimensional data.
9 To alter the number of shims, carry out the following operations.
10. Remove the tappet chest cover.
11. Remove the setscrews securing the push rod housing to the pump mounting flange. Remove the housing and flange, together with the shim(s).
12. Care should be taken to ensure that no dirt or other foreign matter is allowed to come into contact with the exposed components, especially the eccentrics or the cam face of the followers.
13. Add or subtract the necessary shim washers.
14. Fit the push rod housing, shims, and pump mounting flange to the tappet chest cover.
15. Fit the push rod.
16. Temporarily fit the tappet chest cover assembly to the crankcase. Using a depth micrometer, confirm that the dimension from the pump mounting flange to the top face of the push rod (item 10) is correct, refer to Section E4, Dimensional data.
17. When the dimension from the pump mounting flange to the top face of the push rod is correct, remove the tappet chest cover. Then, secure the retaining setscrews with the tabs of the lock-washers. Fit the cover as described in Section E7.
18. Fit the hydraulic pump(s) as described in Chapter G.

Engine removal and installation

This section describes the removal of the engine through the bonnet aperture. Details for the removal of the engine, torque converter transmission, and front sub-frame as one unit from beneath the car, are given in Chapter H.

The operations listed in this section are the basic steps to be followed when removing the engine. The sequence of operations may vary slightly dependent upon the specification of the vehicle. Therefore, it is always advisable to check that all cables, looms, pipes, etc., have been disconnected before lifting the engine out of the vehicle.

Engine – To remove (see figs. E12-1 and E12-2)

1. Drive the car onto a ramp.
2. Carry out the usual workshop safety precautions.
3. Chock both the front and rear road wheels.
4. Disconnect the battery.
5. Raise the bonnet and ensure that the wing covers RH 2684 and liners RH 2685 are fitted.
6. Remove the bonnet (see Chapter S).
7. Drain the engine cooling system (see Chapter L).
8. Depressurize the hydraulic systems (see Chapter G).
9. Drain the engine oil (see Section E10).

Disconnect the oil cooler pipes from the filter elbow. Allow any oil to drain into a container and then blank off the pipe ends.

10. Discharge the air conditioning system refrigerant (see Chapter C).
11. Remove the speed control system actuator.
12. Remove the top and bottom radiator hoses and blank the open connections.
13. Remove the engine fan assembly. Then, remove the radiator and cowl assembly (see Chapter L).
14. Disconnect the heater tap feed and return hoses from the engine. On 1989 model year cars, also disconnect the coolant expansion bottle return hose.
15. Disconnect the refrigerant pipes from the rear of the compressor.
16. Remove the air intake trunking. On cars fitted with an exhaust emission control system, also remove the air injection hose to the air filter housing. On 1989 model year turbocharged cars, disconnect the turbocharger to intercooler duct.
17. Fit a clamp to the feed hose from the steering system remote reservoir. Disconnect the steering pump and steering rack to oil cooler hoses. Allow the oil to drain into a container and then blank the connections.
18. Disconnect and remove the exhaust gas recirculation (EGR) feed pipe (if fitted).
19. Support the weight of the rear section of the exhaust system. Remove the front section of the exhaust system and downtake pipes (see Chapter Q).

On turbocharged cars, remove the exhaust connecting pipe between 'A' and 'B' bank manifolds.

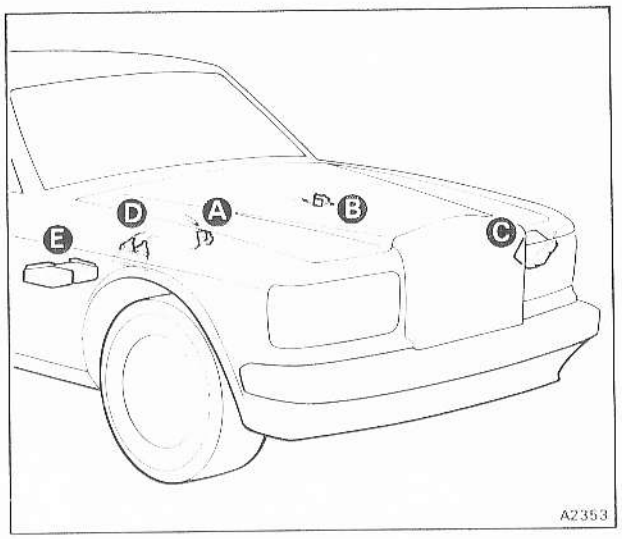
20. Depressurize the fuel system. Then, disconnect the body to engine fuel hoses. Also, the fuel evaporative control canister hose, if applicable.
21. Clamp the hydraulic system reservoir to brake pump hoses to prevent reservoir drainage. Then, disconnect the hoses from the pump inlet pipes.

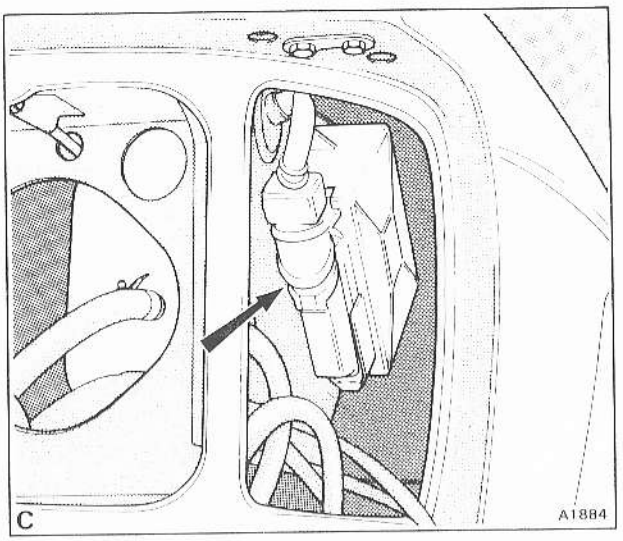
Fit blanks to the open connections.

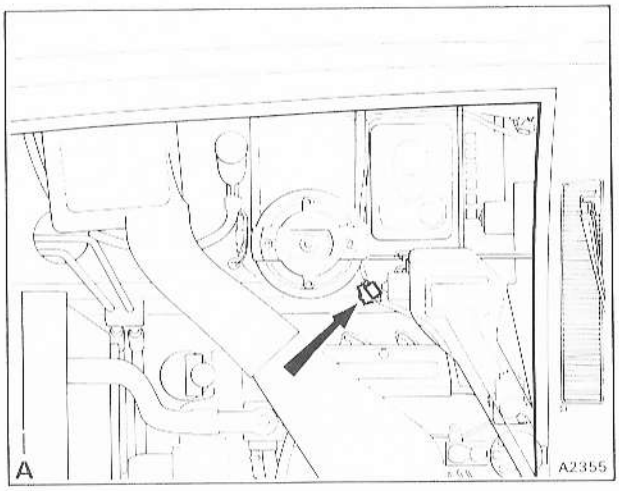
22. Remove the starter motor (see Electrical Manuals – TSD 4701 or TSD 4848).
23. Position a jack under the rear of the engine sump. Place a piece of wood between the head of the jack and the sump. Take the weight of the engine.
24. On left-hand drive cars, remove the throttle linkage cross-shaft.
25. Remove the torque converter transmission (see Chapter T).
26. On four door cars only, disconnect the small dampers (adjacent to the engine rear mounts) from the transmission adapter plate.
27. Disconnect the accumulator to body hoses. On turbocharged cars, these hoses are situated on the left-hand side of the engine compartment.
28. Temporarily clamp the two accumulator low pressure return to reservoir hoses. Detach the hoses and suitably blank the open ends.
29. Disconnect the accelerator linkage at the long rod and detach the isolator trapeze from the body.
30. Disconnect all the relevant electrical connections and clipping points on either side of the engine (see figs. E12-1 and E12-2).

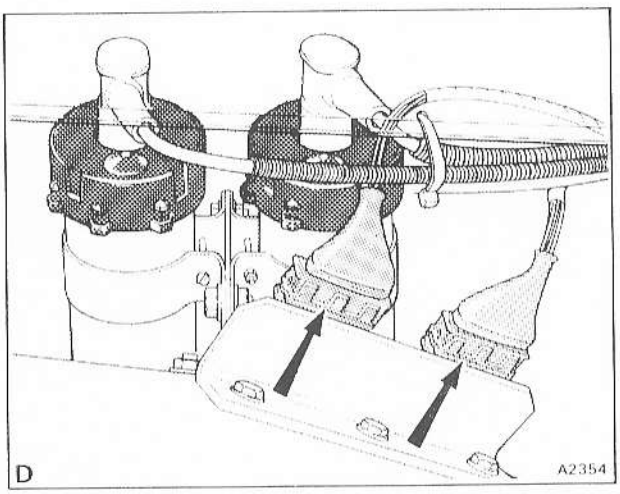
On turbocharged cars, remove the left-hand front side/position lamp. Then, disconnect the boost control electronic control unit/knock sensor (ECU) (see inset C). Also, on cars prior to 1989 model year, disconnect the ignition and fuel injection electronic control units (ECU) situated beneath the facia in the right-hand footwell area. Remove the engine closing plate on the bulkhead and pull the two plugs removed, through to the engine compartment.

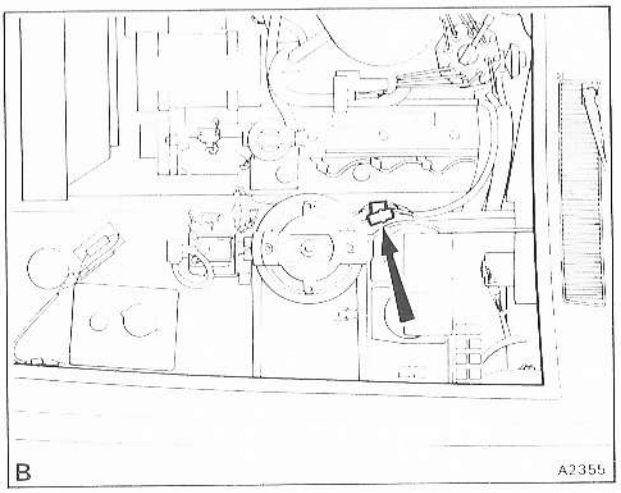
31. Detach the electrical connections to the ignition coil(s) and distributor(s).
32. To lift the engine, fit slings around the front and rear of the engine. Ensure that the front sling is not positioned under the front pulley. Using the special lifting sling RH 9732, connect the front and rear slings to an overhead hoist.
33. Take the weight of the engine.
34. Disconnect the front and rear engine mounts.
35. Check to ensure that no cables, pipes, etc., remain connected to the engine.
36. Carefully lift the engine and then move slightly forward, ensuring that it does not foul any point of the engine compartment.
37. Continue to lift the engine out of the vehicle. Once it is clear, lower it down onto a suitable stand and secure it in the upright position.











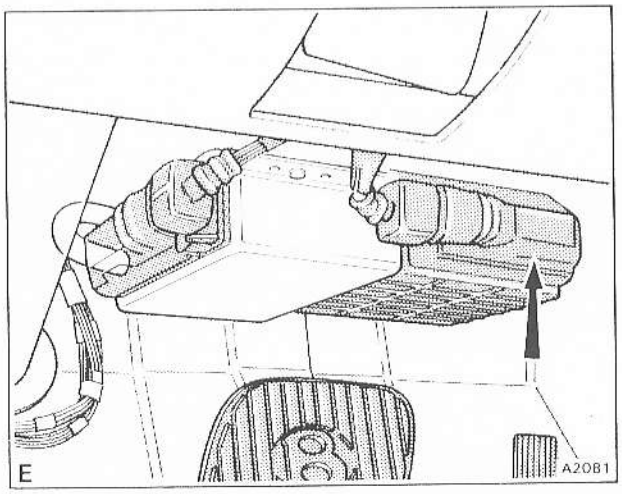
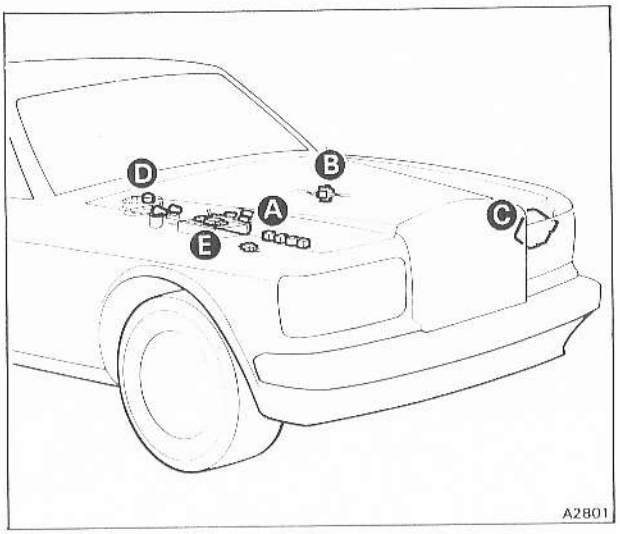
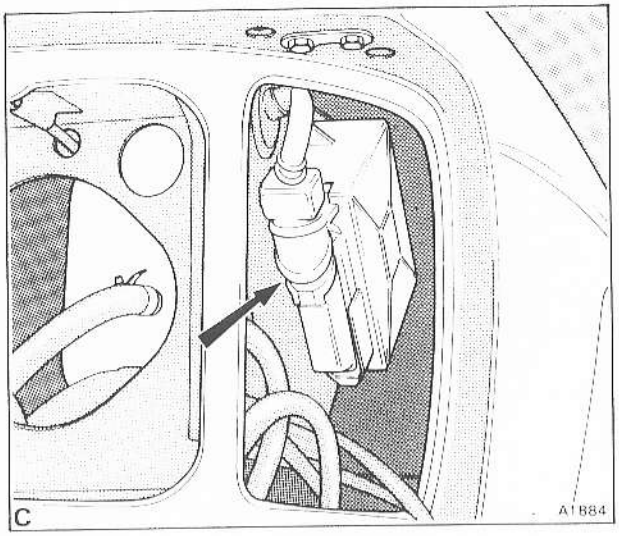
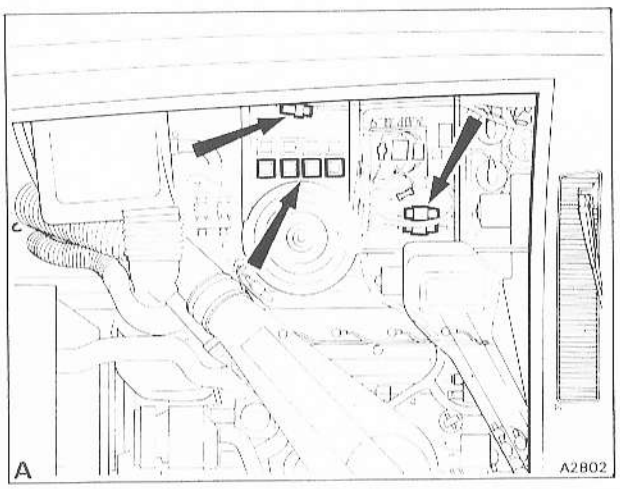


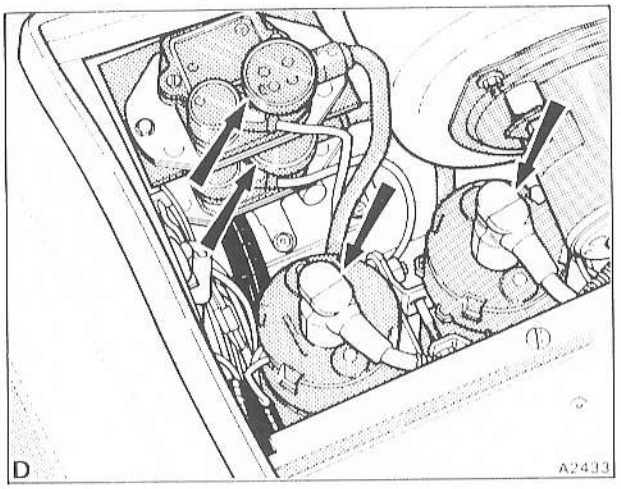
Fig. E12-1 Electrical disconnection points (Cars prior to 1989 model year)

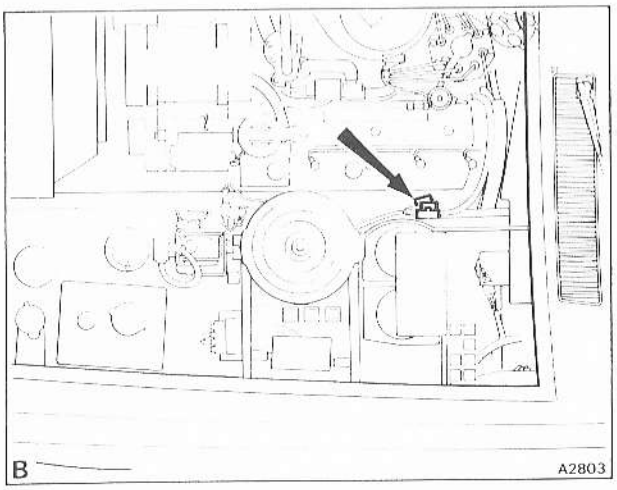
A Valance to engine loom connections (All cars)
B Valance to engine loom connections (All cars)
C Boost control ECU (Turbocharged cars only)
D Ignition amplifier connections (Turbocharged cars only)
E Electronic control unit connections (Turbocharged cars only)











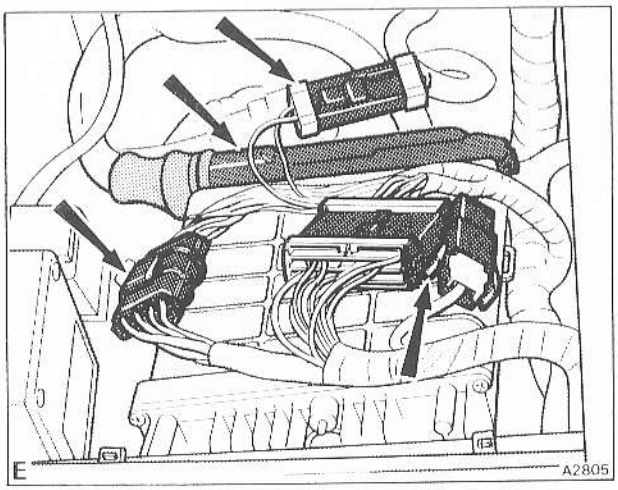


Fig. E12-2 Electrical disconnection points (1989 model year cars)

A Valance to engine loom connections and relay mounts (All cars)
B Valance to engine loom connections (All cars)
C Boost control ECU (Turbocharged cars only)
D Ignition amplifier and coil connections (Turbocharged cars only)
E Electronic control unit and valance to engine loom connections (Turbocharged cars only)

Engine – To fit (see figs. E12-1 and E12-2)
Fit the engine by reversing the procedure given for removal, noting the following.

1. When lowering the engine into position, ensure that the flywheel assembly and rear of the engine do not become trapped against the rear crossmember of the sub-frame.
2. With the front engine mounting setscrews slack, adjust the position of the engine mounting stop plate so that there is a gap of between 1,52 mm and 2,28 mm (0.060 in and 0.090 in), between the bonded rubber strip on the stop plate and the crossmember bracket (see fig. E12-3).

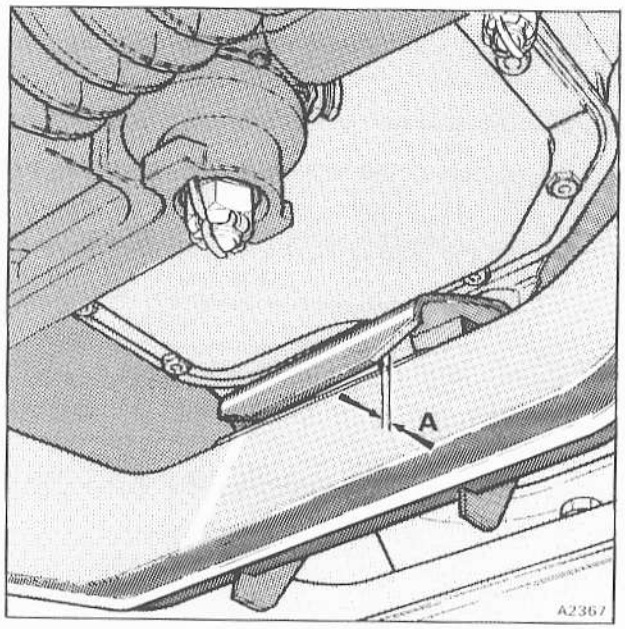


Fig. E12-3 Engine front mount stop plate gap

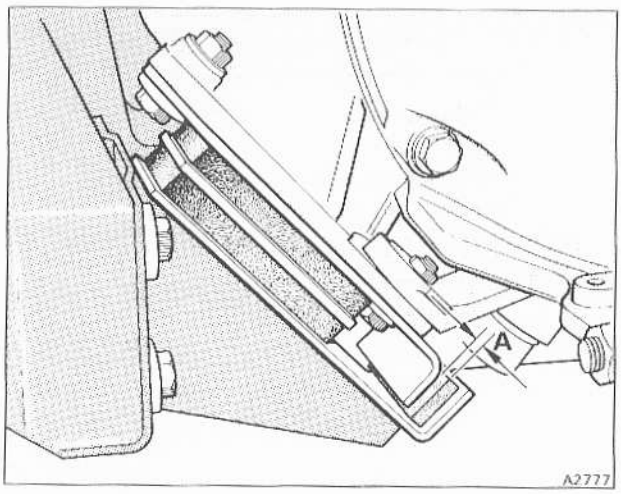


Fig. E12-4 Rear engine mount setting (1989 model year cars)
A 4,0 mm to 5,5 mm (0.158 in to 0.216 in)

The stop plate has elongated holes to allow adjustment.

On 1989 model year cars, the distance between the engine roll stop plate and buffer on each rear engine mount must be set to between 4,0 mm and 5,5 mm (0.158 in and 0.216 in). To carry out this operation, first slacken the top securing bolts on the mount to be adjusted. Using a soft metal drift, carefully tap the top plate of the mount until the correct setting is obtained (see fig. E12-4). Then, torque tighten the bolts.

3. On four door cars only, when fitting the small dampers adjacent to the rear engine mounts, the damper rods should point downwards. Fit the two tapered rubbers either side of the engine mounting plate bracket with the taper pointing downwards and the large cup washer on top. The two smaller cup washers and rubbers fit on each side of the sub-frame bracket.
4. On turbocharged cars prior to 1989 model year, reseal the bulkhead closing plates with Butyl strip sealant after the two ECU connections have been made in the right-hand footwell area.
5. Connect all pipes, hoses, and cables as described in the relevant chapters.
6. Fill all necessary systems as described in the relevant chapters.
7. Immediately the engine starts, inspect for obvious leaks. Then, whilst the engine is warming-up carry out a more detailed inspection for leaks.
8. When the engine is at normal operating temperature, check all fluid levels and correct as necessary.
9. Road test the car and carry out any adjustments as necessary.

Engine drive belts

Before commencing to adjust the drive belts, inspect them for signs of wear or cracking. Any belts found to be unsatisfactory, should be renewed.

If after adjustment, a matched pair of belts have a marked variation in tension, a new pair should be fitted. Always renew both belts in a matched pair, even if only one belt is faulty.

Three belt tension loads are specified; a new belt load for replacement (new) belts, a retensioning load for belts which are satisfactory for further service, and a minimum acceptable load, below which the belt should be retensioned.

The belt tension must be checked at a point midway between two pulleys (see fig. E13-1), using the Atlas Copco belt tensometer, RH 12211.

Belt dressing must not be applied to prevent belt slip.

Belt tension – To check

1. Ensure that the usual workshop safety precautions are carried out.
2. Ensure that the engine is cold (a warm engine will return a slightly higher belt tension reading).
3. Examine the back of the belt around the midway point of the span. If any irregularities are found, caused by a join in the fibres, etc., then rotate the engine until the area of belt is acceptable.
4. Belt tension readings should always be taken on one belt only. Therefore, when measuring twin belts the belt blocker should be fitted prior to using the tensometer (see fig. E13-2).
5. Open the jaws of the clamping unit by applying pressure at the two points indicated by the arrows in figure E13-2.
6. Position the clamping unit at a point midway between pulleys. Release the pressure from the unit.
7. Adjust the small Allen screw on the clamping unit until the unit will only just slide along the belt.
8. Squeeze the trigger on the hand held gauge. The reading displayed on the gauge when the red lamp illuminates, is the belt tension. Repeat this procedure until the readings are consistent. Note this final figure.
9. Remove the clamping unit from the belt.
10. Rotate the engine.
11. Repeat Operations 5 to 8 inclusive. The average of the two noted readings is the drive belt tension.

Note If the two readings vary by more than 45 N (10 lbf), take a third reading after again rotating the engine. Discard the exceptional value and average the two remaining readings.

12. If necessary, adjust the belt tension as described under the relevant heading.

Note Do not adjust the drive belt tension unless it has fallen below the **minimum acceptable load.**

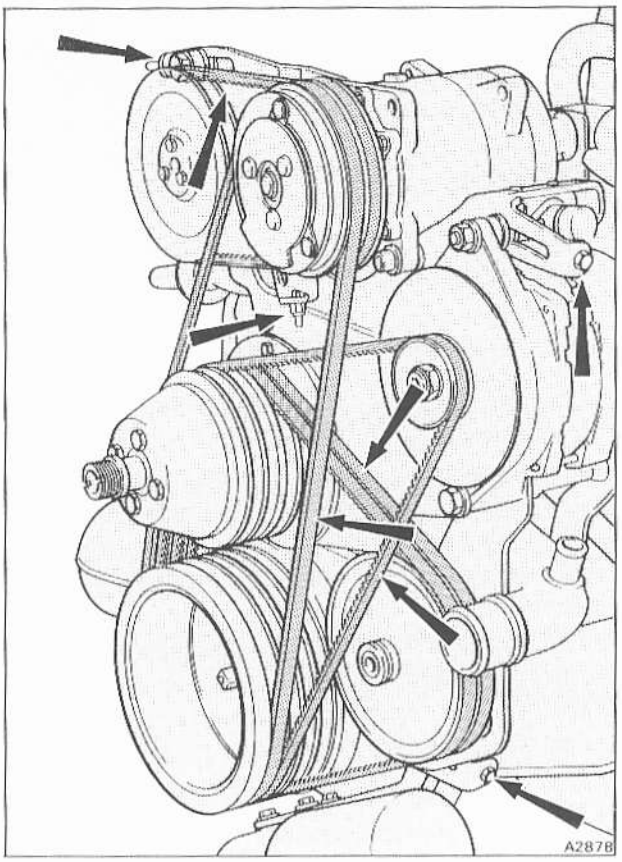


Fig. E13-1 Engine drive belt adjustment and tension checking points

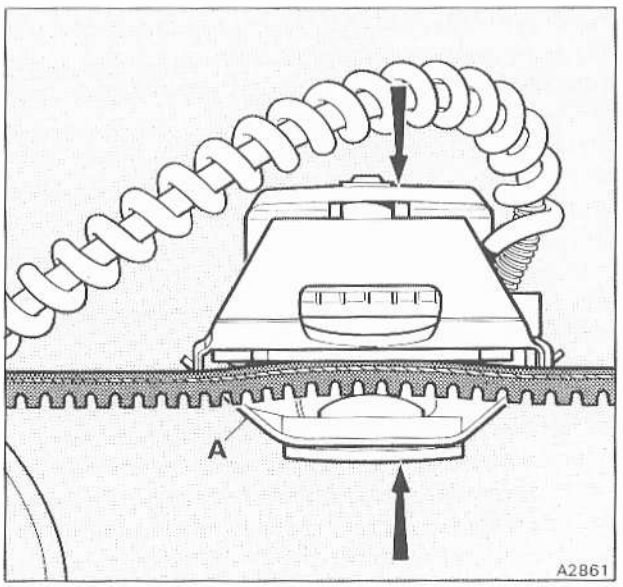


Fig. E13-2 Clamping unit in position
A Belt blocker

Drive belts – To renew

1. Release the tension from the particular belt(s) and remove the belt(s) from the pulleys.

Always ensure that the correct approved replacement is obtained and fitted.

2. Inspect the pulleys and pulley grooves.
3. Before fitting the belts always ensure that they are in good condition with no marked variation in size.

Crankshaft to coolant pump/steering pump

The belt tension meter reading should be as follows

New belt load	400 N to 450 N (90 lbf to 100 lbf)
Retensioning load	360 N to 400 N (80 lbf to 90 lbf)
Minimum acceptable load	250 N (55 lbf)

1. The tension of this matched pair of belts is adjusted by altering the position of the steering pump.
2. Slacken the setscrew securing the steering pump mounting bracket pivot and the clamping setscrew on the belt tensioner situated below the steering pump.
3. Carefully adjust the tensioner until the correct belt tension is attained.
4. When the belt tension is correct, tighten the tensioner clamp and mounting bracket pivot setscrews.
5. If the alternator belt is to be adjusted the mounting bracket pivot setscrew can remain slack until adjustment has been carried out.
6. Ensure the belt tension is still correct when the steering pump is fully secured.

Crankshaft to coolant pump/alternator

The belt tension meter reading should be as follows

New belt load	400 N to 450 N (90 lbf to 100 lbf)
Retensioning load	360 N to 400 N (80 lbf to 90 lbf)
Minimum acceptable load	250 N (55 lbf)

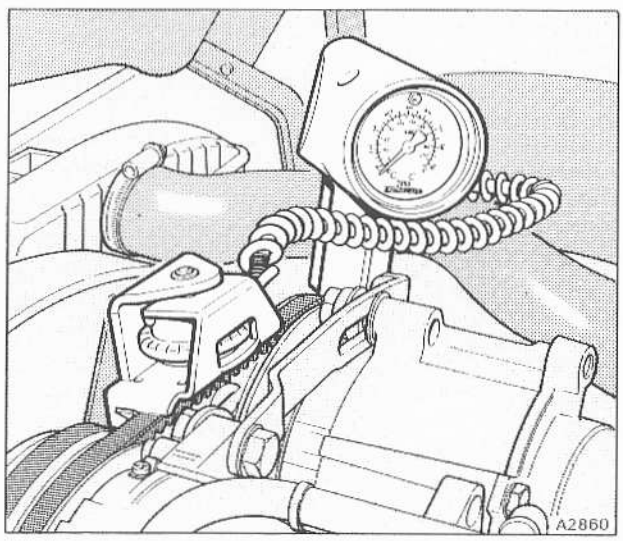


Fig. E13-3 Checking a belt tension

1. The belt tension is adjusted by altering the position of the alternator.
2. Slacken the alternator mounting setscrew and the clamping setscrew on the belt tensioner situated above the alternator.
3. Carefully adjust the tensioner until the correct belt tension is attained.
4. When the belt tension is correct, tighten the belt tensioner clamping setscrew and alternator mounting setscrew.
5. Ensure the belt tension is still correct when the alternator is fully secured.

Crankshaft to refrigeration compressor

The belt tension meter reading should be as follows

New belt load	400 N to 450 N (90 lbf to 100 lbf)
Retensioning load	360 N to 400 N (80 lbf to 90 lbf)
Minimum acceptable load	250 N (55 lbf)

1. The belt tension is adjusted by altering the position of the refrigeration compressor.
2. Slacken the compressor pivot bolts at the front and the rear of the compressor and the belt tensioner clamping setscrew.
3. Carefully adjust the tensioner until the correct belt tension is attained.
4. When the belt tension is correct, tighten the belt tensioner clamping setscrew and the compressor pivot bolts.
5. Ensure the belt tension is still correct when the compressor is fully secured.

Note If the engine is fitted with an air injection pump, it will be necessary to release the tension of its drive belt as the tension will be affected by the adjustment of the refrigeration compressor.

The belt should be retensioned as described under Air pump to refrigeration compressor, when adjustment of the refrigeration compressor belt has been completed.

Air pump to refrigeration compressor

The belt tension meter reading should be as follows

New belt load	250 N to 300 N (55 lbf to 65 lbf)
Retensioning load	250 N to 300 N (55 lbf to 65 lbf)
Minimum acceptable load	200 N (40 lbf)

1. The belt tension is adjusted by altering the position of the air pump.
2. Slacken the air pump pivot setscrew and the belt tensioner clamping setscrew.
3. Carefully adjust the tensioner until the correct belt tension is attained.
4. When the belt tension is correct, tighten the belt tensioner clamping setscrew and the air pump pivot setscrew.
5. Ensure the belt tension is still correct when the air pump is fully secured.

Fault diagnosis

Symptoms	Possible cause
1. Engine fails to start (starter motor inoperative)	1. (a) Battery master switch in OFF position *(cars other than those conforming to a West German specification).* (b) Gear range selector out of neutral or park position. (c) Ignition fuse blown. (d) Battery discharged. (e) Break or high resistance in battery connections and starter relay connections. (f) Auxiliary starter relay faulty (if fitted). (g) Faulty starter motor.
2. Engine fails to start (starter motor operates but fails to turn engine)	2. (a) Battery discharged. (b) Faulty starter motor circuit (refer to Electrical Manuals – TSD 4701 or TSD 4848). (c) Faulty starter motor. (d) Faulty starter solenoid (refer to Electrical Manuals – TSD 4701 or TSD 4848).
3. Engine fails to fire	3. (a) No fuel delivered to engine (refer to Engine Management Systems Manual – TSD 4737). (b) Faulty ignition system (refer to Engine Management Systems Manual – TSD 4737). (c) Excess fuel in engine (refer to Engine Management Systems Manual – TSD 4737). (d) Incorrect metering of fuel (refer to Engine Management Systems Manual – TSD 4737).
4. Poor engine idling	4. (a) Incorrect metering of fuel (refer to Engine Management Systems Manual – TSD 4737). (b) Incorrect ignition timing (refer to Engine Management Systems Manual – TSD 4737). (c) Air leaks in induction system (refer to Engine Management Systems Manual – TSD 4737). (d) Incorrect idle speed (refer to Engine Management Systems Manual – TSD 4737). (e) Air leaks in exhaust system (refer to Chapter Q and Engine Management Systems Manual – TSD 4737).
5. Incorrect engine idle speed	5. (a) Incorrect metering of fuel (refer to Engine Management Systems Manual – TSD 4737). (b) Throttle controls sticking (refer to Engine Management Systems Manual – TSD 4737). (c) Incorrect setting of throttle body air by-pass screw (refer to Engine Management Systems Manual – TSD 4737). (d) Air leaks in induction system (refer to Engine Management Systems Manual – TSD 4737). (e) Faulty idle speed control solenoid (refer to Engine Management Systems Manual – TSD 4737).

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Symptoms	Possible cause
6. Irregular running	6. (a) Faulty sparking plug(s). (b) Faulty ignition system (refer to Engine Management Systems Manual – TSD 4737). (c) Air leaks in induction system (refer to Engine Management Systems Manual – TSD 4737). (d) Air leaks in exhaust system (refer to Chapter Q and Engine Management Systems Manual – TSD 4737). (e) Incorrect metering of fuel (refer to Engine Management Systems Manual – TSD 4737). (f) Inlet and exhaust valves not seating correctly (refer to Section E8). Examine valve seats and springs. (g) Defective cylinder head gasket(s) (refer to Section E8). Examine cylinder head gasket(s).
7. Loss of power	7. (a) Faulty sparking plug(s). (b) Faulty ignition system (refer to Engine Management Systems Manual – TSD 4737). (c) Air leaks in induction system (refer to Engine Management Systems Manual – TSD 4737). (d) Air leaks in exhaust system (refer to Chapter Q and Engine Management Systems Manual – TSD 4737). (e) Blocked or obstructed air intake filter (refer to Engine Management Systems Manual – TSD 4737). (f) Incorrect metering of fuel (refer to Engine Management Systems Manual – TSD 4737). (g) Throttle linkage sticking or incorrectly adjusted (refer to Engine Management Systems Manual – TSD 4737). (h) Worn, burnt, or sticking valves. Broken or weak valve springs (refer to Section E8). (i) Defective cylinder head gasket(s) (refer to Section E8).
8. Engine 'spits back'	8. (a) Incorrect metering of fuel (refer to Engine Management Systems Manual – TSD 4737). (b) Inlet valves not seating correctly (refer to Section E8). (c) Incorrect grade of fuel. (d) Air leaks in induction system (refer to Engine Management Systems Manual – TSD 4737). (e) Faulty ignition system (refer to Engine Management Systems Manual – TSD 4737). (f) Heavily carboned engine (refer to Section E8).
9. Engine 'runs on'	9. (a) Engine overheating. (b) Faulty ignition timing (refer to Engine Management Systems Manual – TSD 4737). (c) Incorrect metering of fuel (refer to Engine Management Systems Manual – TSD 4737). (d) Incorrect idle speed. (e) Throttle controls sticking (refer to Engine Management Systems Manual – TSD 4737).

Symptoms	Possible cause
10. Detonations in silencer	10. (a) Incorrect metering of fuel (refer to Engine Management Systems Manual – TSD 4737). (b) Faulty ignition system (refer to Engine Management Systems Manual – TSD 4737). (c) Air leaks in exhaust system (refer to Chapter Q and Engine Management Systems Manual – TSD 4737). (d) Exhaust valve(s) sticking (refer to Section E8).
11. Overheating	11. (a) Loss of coolant. (b) Faulty thermostat. (c) Broken or slipping drive belts. (d) Faulty coolant pump. (e) Weak fuel/air mixture. (f) Inadequate engine lubrication. (g) Faulty ignition system (refer to Engine Management Systems Manual – TSD 4737). (h) Blocked cooling system. (i) Restricted air flow through matrix.
12. Low oil pressure	12. (a) Inadequate oil supply. (b) Low oil level in sump (see Section E10). (c) Defective oil pressure gauge. (d) Worn or defective oil pump (see Section E10). (e) Blocked oil pick-up strainer. (f) Defective seal(s) on oil pick-up assembly. (g) Defective seal(s) in main oil galleries (core plugs). (h) Engine overheating. (i) Wrong specification oil (too thin), or water in oil.
13. Excessive fuel consumption	13. (a) Leaks from fuel system. (b) Incorrect metering of fuel (refer to Engine Management Systems Manual – TSD 4737). (c) Blocked air cleaner filter (refer to Engine Management Systems Manual – TSD 4737). (d) Faulty ignition system (refer to Engine Management Systems Manual – TSD 4737). (e) Loss of engine cylinder compression. (f) Cylinder head gasket(s) leaking.

Special torque tightening figures

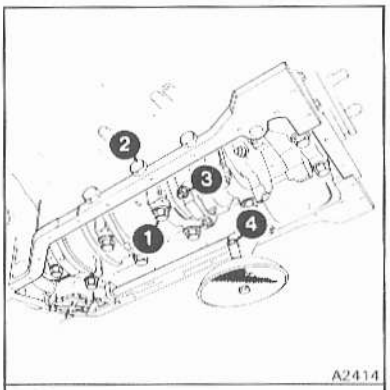
Introduction

This section contains the special torque tightening figures applicable to Chapter E.

For the standard torque tightening figures refer to Chapter P.

Components used during the manufacture of the vehicle have different thread formations (Metric, UNF, UNC, etc.). Therefore, when fitting nuts, bolts, and setscrews it is important to ensure that the correct type and size of thread formation is used.

Section E5 to E10



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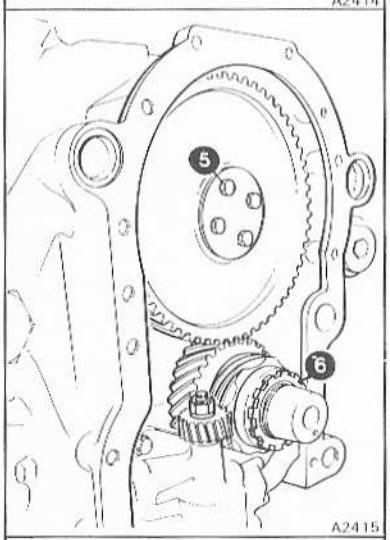
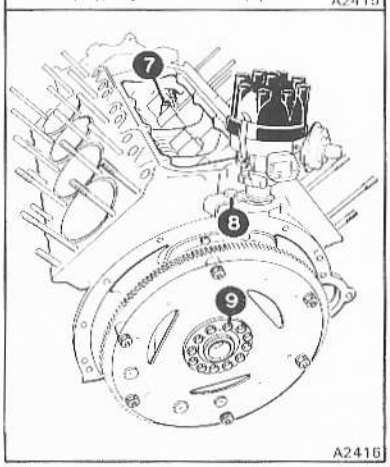
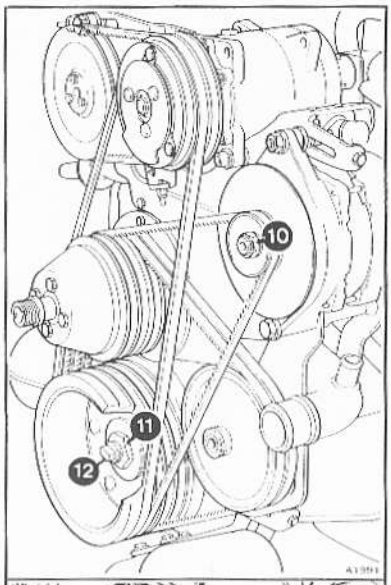


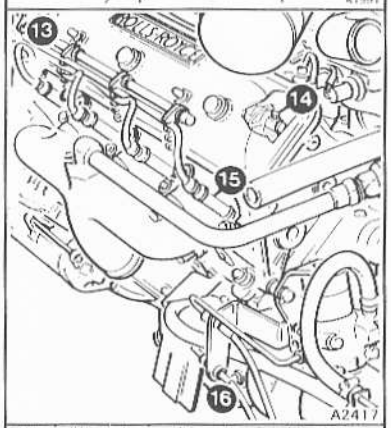
A2415

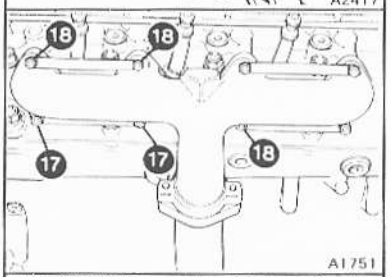


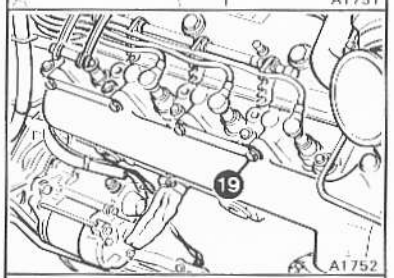
A2416

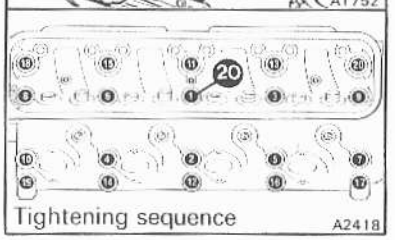
Ref.	Component	Nm	kgf m	lbf ft
1	Setscrew – Main bearing cap	79 – 84	8,0 – 8,5	58 – 62
2	Setscrew – Cross-bolting beam	52 – 56	5,3 – 5,8	38 – 42
3	Nut – Big end	See Section E6		
4	Castellated nut – Oil pump intake strainer	3	0,3	24 – 30 lbf in
5	Setscrew – Camshaft gear	22 – 24	2,3 – 2,4	16 – 18
6	Serrated nut – Crankshaft pinion (LH thread)	489 – 596	50 – 60	360 – 440
7	Setscrew – Tappet block	11 – 13	1,1 – 1,3	8 – 10
8	Setscrew – Distributor clamp plate Naturally aspirated engines	Finger tight, plus half a turn		
9	Setscrew – Drive plate to crankshaft	40 – 43	4,0 – 4,4	29 – 32





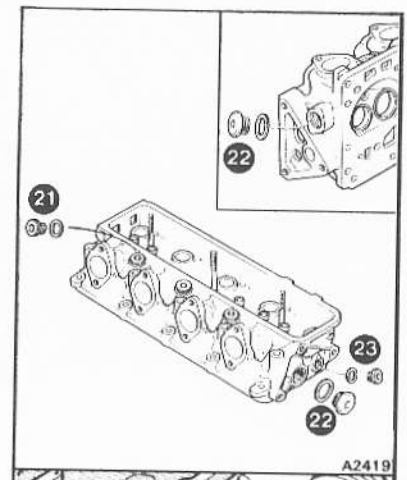


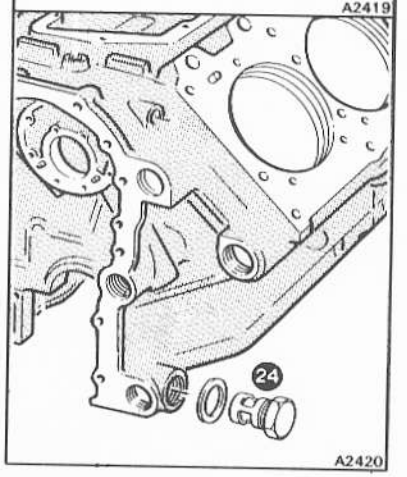




Tightening sequence A2418

Ref.	Component	Nm	kgf m	lbf ft
10	Lock-nut – Alternator pulley	55 – 57	5,5 – 5,8	40 – 42
11	Nut – Crankshaft pulley/damper	489 – 596	50 – 60	360 – 440
12	Stud – Crankshaft	305 – 373	31 – 38	225 – 275
13	Cap nut – Rocker cover	4	0,4	30 – 35 lbf in
14	Setscrew – Rocker shaft pedestal	11 – 13	1,1 – 1,3	8 – 10
15	Sparking plug	25 – 30	2,5 – 3,0	18 – 22
16	Setscrew – Oil level indicator	2	0,2	20 – 22 lbf in
17	Setscrew (2 off) – Exhaust manifold (A3 and A4 lower) Naturally aspirated engines	19 – 21	2,0 – 2,2	14 – 16
18	Setscrew (14 off) – Exhaust manifold	32 – 33	3,2 – 3,4	23 – 25
19	Setscrew (16 off) – Exhaust manifold Turbocharged engines	19 – 21	2,0 – 2,2	14 – 16
20	Nut – Cylinder head Stage 1 Initial tightening	28 – 33	2,8 – 3,4	20 – 25
	Stage 2 Final tightening	68 – 74	7,0 – 7,6	50 – 55





Ref.	Component	Nm	kgf m	lbf ft
21	Core plug – brass	34 – 40	3,5 – 4,1	25 – 30
22	Core plug – aluminium	82 – 88	8,3 – 8,9	60 – 65
23	Core plug – aluminium	55 – 61	5,6 – 6,2	40 – 45
24	Plug – Bobbin retaining	68 – 74	7,0 – 7,6	50 – 55

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Workshop tools

RH 2684	Wing cover set
RH 2685	Wing cover liners
RH 7094	Valve spring compressor
RH 7095	Extractor – cylinder liner
RH 7126	Spanner – cylinder head nuts
RH 7207	Extraction and insertion tool – inlet and exhaust valve guides
RH 7208	Extractor – main bearing caps (Cars prior to 1989 model year)
RH 7498	Extractor attachment – main bearing caps
RH 7825	Reamer – inlet and exhaust valve guides
RH 7827	Tipped reamer – inlet and exhaust valve guides
RH 8141	Extractor – oil pump driven gear
RH 9646	Insertion tool – crankshaft rear seal
RH 9655	Protective sleeve – crankshaft rear seal
RH 9732	Engine lifting sling
RH 9765	Extractor – front pulley driving flange
RH 12054	Extractor and fitting tool – crankshaft front end stud
RH 12055	Spanner – crankshaft serrated nut
RH 12211	Tensometer – engine drive belts

2/89
Printed in England